# Instructor’s Manual Exploring Microsoft® Excel 2016, Chapter 2

## Available Instructor Resources

|  |  |  |
| --- | --- | --- |
| **Resource** | **File Name** | **Found** |
| **Student Data Files** | [Various](#_PROJECTS_AND_EXERCISES), click link to see file list | Online Instructor Resource Center |
| **Solution Files** | [Various](#_PROJECTS_AND_EXERCISES), click link to see file list | Online Instructor Resource Center |
| **Answer Keys** |  | Online Instructor Resource Center |
| Matching | e02\_answerkey\_match.docx |
| Multiple Choice | e02\_answerkey\_mc.docx |
| Concepts Checks | e02\_answerkey\_concepts.docx |
| **Scorecards** | Various, example:  e02p1AutoSales\_scorecard.xlsx | Online Instructor Resource Center |
| **Scoring Rubrics** | e02\_rubric.docx | Online Instructor Resource Center |
| **Annotated Solution Files** | Various, example:  e02\_p1AutoSales\_annsolution.pdf | Online Instructor Resource Center |
| **Scripted Lecture (Script)** | e02\_script.docx | Online Instructor Resource Center |
| Scripted Lecture Data | e02\_script\_data.xlsx |
| Scripted Lecture Solution | e02\_script\_solution.xlsx |
| **PowerPoint Presentation** | e02\_powerpoints.pptx | Online Instructor Resource Center |
| **Testbank** | e02\_testbank.docx | Online Instructor Resource Center |
| **Instructor's Manual (lesson plans incl.)** | e02\_instructormanual.docx | Online Instructor Resource Center |
| **Assignment Sheet** | e02\_assignsheet.docx | Online Instructor Resource Center |
| **Prepared Exam (Chapter & App)** |  | Online Instructor Resource Center |
| Prepared Exam-Chap Instruction | e02\_exam\_chap\_instruction.docx |
| Prepared Exam-Chap Data | e02\_exam\_chap\_data.xlsx |
| Prepared Exam-Chap Solution | e02\_exam\_chap\_solution.xlsx |
| Prepared Exam-Chap Annotated Sol. | e02\_exam\_chap\_annsolution.pdf |
| Prepared Exam-Chap Scorecard | e02\_exam\_chap\_scorecard.xlsx |
| **File Guide** | e02\_file\_guide.xlsx | Online Instructor Resource Center |
| **Objective Map** | e02\_objectivesmap.xlsx | Online Instructor Resource Center |
| **Grader Project** |  | Online Instructor Resource Center |
| Grader Instruction | e02\_grader\_instruction.docx |
| Grader Data | e02\_grader\_data.xlsx |
| Grader Solution | e02\_grader\_solution.xlsx |
| Grader Annotated Solution | e02\_grader\_annsolution.pdf |
| Grader Scorecard | e02\_grader\_scorecard.xlsx |

## CHAPTER OBJECTIVES

### When students have finished reading this chapter, they will be able to:

* Use relative, absolute, and mixed cell references in formulas
* Insert a function
* Insert basic math and statistics functions
* Use date functions
* Determine results with the IF function
* Use Lookup functions
* Calculate payments with the PMT function

## CHAPTER OVERVIEW

Students will increase their knowledge and understanding of formulas and functions, and learn how to build robust workbooks that perform a variety of calculations for quantitative analysis. The ability to build sophisticated workbooks and interpret the results increases the value of an employee to any organization.

### The major sections in this chapter are:

1. **Formula Basics**. In this section, students will learn how to create formulas in which cell addresses either change or remain fixed when copied. They will learn how to use relative, absolute, and mixed cell references in formulas.
2. **Function Basics**. In this section, students will learn how to work withExcel functions as predefined computations that simplify creating a formula that performs a complex calculation. Students will learn how to use basic math and statistics functions such as SUM, AVERAGE, MEDIAN, MIN, MAX, and COUNT, and perform calculations with quick analysis tools. They will also learn how to use the TODAY and NOW functions for the date.
3. **Logical, Lookup, and Financial Functions.** In this section, students will use logical functions such as the IF function to determine results, the VLOOKUP and HLOOKUP functions to look up a value in a list to identify the applicable value, and financial functions such as the PMT function to calculate monthly payments for a loan or an investment.

## CLASS RUN-DOWN

1. Have students turn in homework assignments.
2. Talk about the chapter using the discussion questions listed below.
3. Use a PowerPoint Presentation to help students understand the chapter content.
4. Demonstrate Excel 2016 formulas and functions.
5. [Run through the Scripted Lectures for the chapter. Give special attention to areas in which students might be challenged.](#_WHEN_USING_SCRIPTED)
6. Have students complete the Capstone Exercise for Excel Chapter 2.
7. Use MyITLlab for in-class work or to go over homework.
8. Give students the homework handout for the next class period.

## LEARNING OBJECTIVES

### At the end of this lesson, students should be able to:

* Use a Relative Reference
* Use an Absolute Reference
* Use a Mixed Cell Reference
* Insert a Function
* Insert a Function using Formula AutoComplete
* Use the Insert Function Dialog Box
* Use the SUM Function
* Use the AVERAGE and MEDIAN Functions
* Use the MIN and MAX Functions
* Use the COUNT Functions
* Perform Calculations with Quick Analysis tools
* Use the TODAY Function
* Use the NOW Function
* Use the IF Function
* Use the VLOOKUP Function
* Create the Lookup Table
* Use the HLOOKUP Function
* Use the PMT Function

## KEY TERMS

**Absolute cell reference**–A designation that indicates a constant reference to a specific location; the cell reference does not change when you copy the formula.

**Argument**–A positional reference contained within parentheses in a function such as a cell reference or value, required to complete a function and produce output.

**AVERAGE function**–A predefined formula that calculates the arithmetic mean, or average, of values in a range of cells.

**Breakpoint**–The lowest value for a category or in a series.

**Column index number**–The column number in the lookup table that contains the return values.

**COUNT function**–A predefined formula that tallies the number of cells in a range that contain values you can use in calculations, such as numerical and date data, but excludes blank cells or text entries from the tally.

**COUNTA function**–A predefined formula that tallies the number of cells in a range that are not blank, that is, cells that contain data, whether a value, text, or a formula.

**COUNTBLANK function**–A predefined formula that tallies the number of cells in a range that are blank.

**Formula AutoComplete**–A feature that displays a list of functions and defined names that match letters as you type a formula.

**Function**–A predefined computation that simplifies creating a formula that performs a complex calculation and produces a result based on inputs known as arguments.

**Function ScreenTip**–A small pop-up description that displays the function’s arguments.

**HLOOKUP function**–A function that looks for a value in the top row of a specified table array and returns another value located in the same column from a specified row.

**IF function**–A predefined formula that evaluates a condition and returns one value if the condition is true and a different value if the condition is false.

**Logical test**–An expression that evaluates to true or false.

**Lookup table**–A range that contains data for the basis of the lookup and data to be retrieved.

**Lookup value**–The cell reference of the cell that contains the value to look up.

**MAX function**–A predefined formula that identifies the highest value in a range.

**MEDIAN function**–A predefined formula that identifies the midpoint value in a set of values.

**MIN function**–A predefined formula that identifies the lowest value in a range.

**Mixed cell reference**–A designation that combines an absolute cell reference with a relative cell reference. The absolute part does not change but the relative part does when you copy the formula.

**Nested function**–A function that contains another function embedded inside one or more of its arguments.

**NOW function**–A predefined formula that calculates the current date and military time that you last opened the workbook using the computer's clock.

**Nper**–Total number of payment periods.

**PMT function**–A function that calculates the periodic payment given a fixed rate, number of periods (also known as term), and the present value of the loan (the principle).

**PV**–A predefined formula that calculates the present value of a loan.

**Quick Analysis**–A set of analytical tools you can use to apply formatting, create charts or tables, and insert basic functions.

**Range\_lookup**–An argument that determines how the VLOOKUP and HLOOKUP functions handle lookup values that are not an exact match for the data in the lookup table.

**Rate**–The periodic interest rate; the percentage of interest paid for each payment period; the first argument in the PMT function.

**Relative cell reference**–A designation that indicates a cell’s relative location from the original cell containing the formula; the cell reference changes when the formula is copied.

**SUM function**–A predefined formula that calculates the total of values contained in one or more cells.

**Syntax**–A set of rules that governs the structure and components for properly entering a function.

**Table array**–The range that contains the lookup table.

**TODAY function*–***A predefined formula that displays the current date.

**VLOOKUP function**–A predefined formula that accepts a value, looks the value up in a vertical lookup table with data organized in columns, and returns a result.

## DISCUSSION QUESTIONS

* What is the difference between using a relative cell reference, an absolute cell reference, and a mixed cell reference?
* Describe three basic math and statistics functions that we often use.
* What are the differences between the COUNT, COUNTBLANK, and COUNTA functions?
* Describe three financial functions that can be useful in making financial decisions.
* What are logical functions? Provide an example to support your explanation.
* How can the Function Arguments dialog box assist you?
* What is the difference between a VLOOKUP function and an HLOOKUP function? What is a lookup table and what is it used for?
* What information is required to use a PMT function?

## WHEN USING SCRIPTED LECTURE IN CLASS, DEMONSTRATE HOW TO:

* Use a Relative Cell Address
* Use an Absolute Cell Reference
* Use a Mixed Cell Reference
* Use the SUM Function
* Use the AVERAGE Function
* Use the MEDIAN Function
* Use the MIN, MAX, and COUNT Functions
* Use the TODAY Function
* Use the VLOOKUP Function
* Use the PMT Function
* Use the IF Function

## CONNECTIONS: PRACTICAL PROJECTS AND APPLICATIONS

* Find the monthly payment for different loan amounts, APRs, and number of years in the term.
* Keep a food diary with calories for the day and use the SUM function to track daily calories.
* Use a spreadsheet that you have developed, and identify the number of cells that contain certain data by using the COUNT, COUNTBLANK, and COUNTA functions.
* Use the VLOOKUP function to calculate federal withholding tax for payroll.

## TEACHING NOTES

### Formula Basics

In this section, students will learn how to create formulas in which cell addresses change or remain fixed when they copy them.

#### Using Relative, Absolute, and Mixed Cell References in Formulas

* Copy a formula down a column or across a row and show that the relative cell reference changes.
* An absolute reference is a permanent pointer to a particular cell, indicated with a dollar sign ($) before the column letter and row number, such as $B$5. When the formula is copied, the absolute cell reference does not change.
* **Teaching Tips**: The F4 key toggles (4 ways) through relative, absolute, and mixed references.
* **Teaching Tips:** Demonstrate what happens when the absolute reference is not used when it is needed, and then show how to fix the problem.
* A mixed reference contains a part absolute and a part relative reference, such as $B5 or B$5. Either the column or row reference changes while the other remains constant when the formula is copied down a column or across a row.
* **Teaching Tips:** In situations where either an absolute or mixed reference can be used, consider using mixed references to shorten the length of the formula.

### Function Basics

An Excel function is a predefined computation that simplifies creating a formula that performs a complex calculation. In this section, students will learn how to use several of these predefined functions.

#### Inserting a Function

* Ensure that students adhere to correct syntax**—**the rules that dictate the structure and components required to perform the necessary calculations.
* Insert a function by first typing an equal sign (=), followed by the function name, and then its arguments enclosed in parentheses.
* Formula AutoComplete displays a list of functions and defined names that match letters as students type a formula.

* To display the Insert Function dialog box, click Insert Function located between the Name Box and the Formula Bar or click Insert Function in the Function Library group on the Formulas tab.
* **Teaching Tips:** In the function ScreenTip, the argument that is currently entered is bold and the optional arguments are in square brackets.
* **Teaching Tips:** If a function is entered and #NAME? displays in the cell, the function name might be mistyped. To avoid this problem, select the function name from the Formula AutoComplete list as the function name is typed, or use the Insert Function dialog box. If a function name is entered correctly in lowercase letters, Excel will convert the name to all capital letters when Enter is pressed.

#### Inserting Basic Math and Statistics Functions

* The SUM function totals values in two or more cells and displays the result in the cell containing the function. This function is more efficient to create when you need to add the values contained in three or more cells.
* **Teaching Tips:** In this book, the function syntax lines are highlighted. Brackets [ ] indicate optional arguments and should not actually be typed when typing the argument. If brackets are present, the argument can be blank.
* **Teaching Tips:** Do not use a function for a basic mathematical expression. For instance, use =A3\*B3, not =SUM(A3\*B3)
* **Teaching Tips:** A nested function occurs when one function is embedded as an argument within another function. Each function has its own set of arguments that must be included.
* Excel provides two functions to calculate central tendency: AVERAGE and MEDIAN. The AVERAGE function calculates the arithmetic mean, or average, for the values in a range of cells. The MEDIAN function finds the midpoint value, which is the value that one half of the data set is above or below. The median is particularly useful because extreme values often influence arithmetic mean calculated by the AVERAGE function.
* **Teaching Tips:** With an odd number of values, the median is the middle value. With an even number of values, the median is the average of the middle two values.
* The MAX and MIN functions analyze a range or a series of ranges to determine the highest or lowest value, such as the highest or lowest score on a test.
* **Teaching Tips**: In most basic aggregate functions such as SUM, MIN, MAX, and AVERAGE, multiple ranges can be used as arguments, such as finding the largest number within two nonadjacent, or nonconsecutive, ranges. Separate each range with a comma in the argument list so that the formula is =MAX(A2:A14,K2:K14).
* The COUNT function tallies the number of cells in a range that contain values used in calculations, such as numerical and date data, but excludes blank cells or text entries from the tally.
* The COUNTBLANK function tallies the number of cells in a range that are blank.
* The COUNTA function tallies the number of cells in a range that are not blank, that is, cells that contain data, whether a value, text, or a formula.
* **Teaching Tips:** When a range of cells containing values is selected, Excel displays the average, count, and sum of those values on the status bar by default. The status bar can be customized to show other selection statistics, such as the minimum and maximum values, for a selected range. To display or hide particular selection statistics, right-click the status bar and select the statistic.
* Quick Analysis is a set of analytical tools used to apply formatting, create charts or tables, and insert basic functions. When a range of data is selected, the Quick Analysis button displays near the bottom-right corner of the selected range. Click the Quick Analysis button to display the Quick Analysis gallery and select the desired analytical tool options.
* **Teaching Tips:** When Decrease Decimal in the Number group is clicked to display fewer or no digits after a decimal point, Excel still stores the original value’s decimal places so that those digits can be used in calculations.
* **Teaching Tips:** The ROUND function changes the stored value to a specified number of decimal places.

#### Using Date Functions

* Excel processes dates as serial numbers so that calculations can be performed using dates.
* The TODAY function displays the current date, such as 6/14/2018, in a cell.
* **Teaching Tips:** Excel updates the function results when the workbook is open or printed.
* The TODAY() function does not require arguments but must include the parentheses. If the parentheses is omitted, Excel displays #NAME? in the cell with a green triangle in the top-left corner of the cell.
* The NOW() function uses the computer’s clock to display the date and military time, such as 6/14/2018 15:30, on which the workbook was most recently opened. (Military time expresses time on a 24-hour period where 1:00 is 1 a.m. and 13:00 is 1 p.m.)
* **Teaching Tips**: The TODAY ad NOW() functions do not continuously update the date and time while the workbook is open. To update the date and time, press F9 or click the Formulas tab and click Calculate Now in the Calculation group.

### Logical, Lookup, and Financial Functions

Lookup and reference functions are useful when looking up a value in a list to identify the applicable value. Financial functions are useful to anyone who plans to take out a loan or invest money. In this section, students will learn how to use the logical, lookup, and financial functions to help them make sound financial decisions.

#### Determining Results with the IF Function

* The most common logical function is the IF function, which returns one value when a condition is met or is true and returns another value when the condition is not met or is false.
* The IF function has three arguments: (1) a condition that is tested to determine if it is either true or false (the logical test), (2) the resulting value if the condition is true, and (3) the resulting value if the condition is false.
* **Teaching Tips:** Create two flowcharts to illustrate an IF function: (1) the first flowchart uses words and numbers to illustrate the condition and results, and (2) the second flowchart replaces the words and values with actual cell references.
* **Teaching Tips:** Every IF function can have at least two right solutions to produce the same results. Since the logical test is a comparative expression, it can be written two ways. For example, comparing whether E2 is greater than B2 can be written using greater than (E2>B2) or the reverse can also be compared to see if B2 is less than E2 (B2<E2). Depending on the logical test, the value\_if\_true and value\_if\_false arguments will switch.
* **Teaching Tips:** When text is used in a formula or function, the text must be enclosed in quotation marks. However, do not use quotation marks around formulas, cell references, or values.
* **Teaching Tips:** Functions can be nested in the logical test, value\_if\_true, and value\_if\_false arguments of the IF function. When functions are nested as arguments, make sure the nested function contains the required arguments for them to work and that the functions are nested in the correct argument to calculate accurate results.

#### Using Lookup Functions

* Use lookup and reference functions to look up values to perform calculations or display results.
* The layout of a lookup table is a range containing a table of values or text that can be retrieved. The table should contain at least two rows and two columns, not including headings.
* The VLOOKUP function accepts a value, looks the value up in a vertical lookup table, and returns a result. Use VLOOKUP to search for exact matches or for the nearest value that is less than or equal to the search value, such as assigning a B grade for an 87% class average.
* **Teaching Tips:** When looking for a less than or equal value, the lookup table needs to be sequenced in ascending order. When looking for exact match, ordering is not required.
* The VLOOKUP function has the following three required arguments and one optional argument: (1) lookup\_value, (2) table\_array, (3) col\_index\_number, and (4) range\_lookup. The lookup value is the reference of the cell that contains the value to look up. The table array is the range that contains the lookup table. The table array range must be absolute and cannot include column labels for the lookup table. The column index number is the column number in the lookup table that contains the return values. The range\_lookup argument is optional, and it determines how the VLOOKUP function handles lookup values that are not an exact match for the data in the lookup table.
* **Teaching Tips:** Avoid using values in formulas because the input values in a worksheet cell might change. However, the value 2 is used in the col\_index\_number argument of the VLOOKUP function. The 2 refers to a particular column within the lookup table and is an acceptable use of a number within a formula.
* **Teaching Tips:** The range\_lookup argument by default is set to True, and looks for values in a range (less than or equal to). A False value in the range\_lookup argument looks for exact match.
* A lookup table is a range containing a table of values and text from which data can be retrieved. The table should contain at least two rows and two columns, not including headings.
* The HLOOKUP function is used when a horizontal lookup table is used. In a horizontal lookup table, the first row contains the values for the basis of the lookup or the breakpoints, and additional rows contain data to be retrieved. The syntax is almost the same as the syntax for the VLOOKUP function, except the third argument is row\_index\_number instead of col\_index\_number.

#### Calculating Payments with the PMT Function

* The PMT function calculates payments for a loan with a fixed amount at a fixed periodic rate for a fixed time period.
* The PMT function uses three required arguments and up to two optional arguments: (1) rate, (2) nper, (3) pv, (4) fv, and (5) type.
* **Teaching Tips**: PMT function returns a negative value because of cash flow perspective. When negative numbers appear in the PMT and other financial functions in Excel, change the pv argument of the PMT function between positive and negative values or by adding a minus (-) sign in front of the PMT function.

## OBJECTIVE TESTS IN MYITLAB

To find an objective test to help your students practice for tests, have them sign in to MyITLab:   
[www.myitlab.com](http://www.myitlab.com).

## ADDITIONAL WEB RESOURCES

1. [Switch between relative, absolute, and mixed references](https://support.office.com/en-us/article/DFEC08CD-AE65-4F56-839E-5F0D8D0BACA9): <https://support.office.com/en-us/article/Switch-between-relative-absolute-and-mixed-references-DFEC08CD-AE65-4F56-839E-5F0D8D0BACA9?ui=en-US&rs=en-US&ad=US>
2. Quick Analysis: <https://support.office.com/en-us/article/Quick-Analysis-12fd74fd-d99b-4faf-b7d5-795cfae81947?ui=en-US&rs=en-US&ad=US>
3. [Create a formula by using a function](https://support.office.com/en-us/article/C895BC66-CA52-4FCB-8293-3047556CC09D): <https://support.office.com/en-us/article/Create-a-formula-by-using-a-function-C895BC66-CA52-4FCB-8293-3047556CC09D?ui=en-US&rs=en-US&ad=US>
4. [IF function](https://support.office.com/en-us/article/69AED7C9-4E8A-4755-A9BC-AA8BBFF73BE2): <https://support.office.com/en-us/article/IF-function-69AED7C9-4E8A-4755-A9BC-AA8BBFF73BE2?ui=en-US&rs=en-US&ad=US>
5. [SUM function](https://support.office.com/en-us/article/043E1C7D-7726-4E80-8F32-07B23E057F89): <https://support.office.com/en-us/article/SUM-function-043E1C7D-7726-4E80-8F32-07B23E057F89?ui=en-US&rs=en-US&ad=US>
6. [COUNTIF function](https://support.office.com/en-us/article/E0DE10C6-F885-4E71-ABB4-1F464816DF34): <https://support.office.com/en-us/article/COUNTIF-function-E0DE10C6-F885-4E71-ABB4-1F464816DF34?ui=en-US&rs=en-US&ad=US>
7. [SUMIF function](https://support.office.com/en-us/article/169B8C99-C05C-4483-A712-1697A653039B): <https://support.office.com/en-us/article/SUMIF-function-169B8C99-C05C-4483-A712-1697A653039B?ui=en-US&rs=en-US&ad=US>
8. [VLOOKUP function](https://support.office.com/en-us/article/0bbc8083-26fe-4963-8ab8-93a18ad188a1): <https://support.office.com/en-us/article/VLOOKUP-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1?ui=en-US&rs=en-US&ad=US>
9. [VLOOKUP: When and how to use it](https://support.office.com/en-us/article/9A86157A-5542-4148-A536-724823014785): <https://support.office.com/en-us/article/VLOOKUP-When-and-how-to-use-it-9A86157A-5542-4148-A536-724823014785?ui=en-US&rs=en-US&ad=US>

## PROJECTS AND EXERCISES

|  |  |  |
| --- | --- | --- |
|  | **Data file** | **Save As** |
| Hands-On Exercise 1 | e02h1Loans.xlsx | e02h1Loans\_LastFirst.xlsx |
| Hands-On Exercise 2 |  | e02h2Loans\_LastFirst.xlsx |
| Hands-On Exercise 3 |  | e02h3Loans\_LastFirst.xlsx |
| Practice Exercise 1 | e02p1AutoSales.xlsx | e02p1AutoSales\_LastFirst.xlsx |
| Practice Exercise 2 | e02p2Bonus.xlsx | e02p2Bonus\_LastFirst.xlsx |
| Mid-Level Exercise 1 | e02m1Payroll.xlsx | e02m1Payroll\_LastFirst.xlsx |
| Mid-Level Exercise 2 |  | e02m2Loan\_LastFirst.xlsx |
| Mid-Level Exercise 3 (collaboration) |  | e02m3\_LastFirst.docx |
| BYC General Case | e02b1CarLoan.xlsx | e02b1CarLoan\_LastFirst.xlsx |
| BYC Disaster Recovery | e02b2ParkCity.xlsx | e02b2ParkCity\_LastFirst.xlsx |
| Capstone | e02c1ClassRing.xlsx | e02c1ClassRing\_LastFirst.xlsx |

## CHAPTER REVIEW/ANSWERS TO END OF CHAPTER MATERIAL

### Key Terms Matching Answer Key

1. A set of rules that governs the structure and components for properly entering a function.

**P.** **Syntax**

2.Displays the current date.

**Q. TODAY function**

3.Indicates a cell’s specific location; the cell reference does not change when you copy the formula.

**A. Absolute cell reference**

4.An input, such as a cell reference or value, needed to complete a function.

**B. Argument**

5. Identifies the highest value in a range.

**H. MAX function**

6.Tallies the number of cells in a range that contain values.

**D. COUNT function**

7.Looks up a value in a vertical lookup table and returns a related result from the lookup table.

**R. VLOOKUP function**

8.A range that contains data for the basis of the lookup and data to be retrieved.

**G. Lookup table**

9.Calculates the arithmetic mean, or average, of values in a range.

**C. AVERAGE function**

10. Identifies the midpoint value in a set of values.

**I. MEDIAN function**

11.Displays the current date and time.

**L. NOW function**

12.Evaluates a condition and returns one value if the condition is true and a different value if the condition is false.

**E. IF function**

13.Calculates the total of values contained in one or more cells.

**O. SUM function**

14.Calculates the periodic payment for a loan with a fixed interest rate and fixed term.

**M. PMT function**

15.Indicates a cell’s location from the cell containing the formula; the cell reference changes when the formula is copied.

**N. Relative cell reference**

16.Contains both an absolute and a relative cell reference in a formula; the absolute part does not change but the relative part does when you copy the formula.

**K. Mixed cell reference**

17.An expression that evaluates to true or false.

**F. Logical test**

18.Displays the lowest value in a range.

**J.** **MIN function**

### Multiple Choice Answer Key

1. If cell E15 contains the formula =$C$5\*J$15, what type of cell reference is the J$15 in the formula?

**c. Mixed reference**

2. What function would most efficiently accomplish the same thing as =(B5+C5+D5+E5+F5)/5?

**b. =AVERAGE(B5:F5)**

3. When you start to type =AV, what feature displays a list of functions and defined names?

**b. Formula AutoComplete**

4. A formula containing the entry =$B3 is copied to a cell one column to the right and two rows down. How will the entry appear in its new location?

**d. =$B5**

5. Which of the following functions should be used to insert the current date and time in a cell?

**c. =NOW()**

6. Which of the following is not an argument of the IF function?

**d. lookup\_value**

7. Which of the following is *not* true about the VLOOKUP function?

**b. The lookup table must be in descending order.**

8. The function =PMT(C5,C7,-C3) is stored in cell C15. What must be stored in cell C5?

**b. Periodic interest rate**

9. Which of the following is *not* an appropriate use of the SUM function?

**d. =SUM(D15-C15)**

10. What is the keyboard shortcut to create an absolute reference?

**c. F4**

### Quick Concept Check Answer Key

1. **What happens when you copy a formula containing a relative cell reference one column to the right?**  
   The cell references in the copied formula adjust one column to the right. For example, if the original formula is =B1+C1, the copied formula would be =C1+D1. The row numbers remain the same while the column letters change relative to the direction (to the right) that you copy the formula.
2. **Why would you use an absolute reference in a formula?**  
   You would use an absolute reference when you want a permanent reference to a particular cell and don’t want that reference to change when you copy the formula to another location.
3. **What is the benefit of using a mixed reference?**

When applicable, mixed references can be used in place of absolute references as a method of shortening the length of the formula.

1. **What visual features help guide you through typing a function directly in a cell?**  
   Formula AutoComplete provides a list of function names as you type. Function ScreenTips provide the syntax of a function as you type it, where the name of the argument you are currently typing is bold.
2. **What type of data do you enter in a Function Arguments dialog box, and what are four things the dialog box tells you?**  
   You enter the required and optional arguments for a particular function. The dialog box tells you the values stored in the respective arguments, the function results, a description of the active argument, a link to get help on the function, and a description of the function itself.
3. **What is the difference between the AVERAGE and MEDIAN functions?**  
   The AVERAGE function provides a mathematical average of values in a range, whereas the MEDIAN function provides the exact midpoint value in a range in which one-half of the numbers are above the median and one-half are below.
4. **What is a nested function, and why would you create one?**  
   A nested function is where one function is used as an argument within another function. You use nested functions to create more complex functions that provide sophisticated calculations that otherwise would be very difficult.
5. **Describe the three arguments for an IF function.**  
   The logical\_test is an expression that evaluates to true or false. The value\_if\_true argument contains the result if the logical\_test is true. The value\_if\_false argument contains the result if the logical\_test is false.
6. **How should you structure a vertical lookup table if you need to look up values in a range?**  
   The lookup values need to be in the first column of the lookup table, and if the last optional argument for range\_lookup is TRUE (or omitted), then the first column of the lookup table should be sorted in ascending order.
7. **What are the first three arguments of a PMT function? Why would you divide by or multiply an argument by 12?**  
   The first argument is the rate of the loan. If the rate is expressed on an annual basis and you want to calculate monthly payments, you must divide the rate by 12. The second argument is nper, the number of periods for the loan. If the term is expressed in years, you must multiply the number of years by 12 to get the total number of monthly payments. The third argument is pv, or the present value of the loan.